SENSITIVE AREAS STUDY

Burke-Gilman Trail Redevelopment
Lake Forest Park, Washington

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INTRODUCTION

This report presents the results of a sensitive areas study for redevelopment of a 2.3-mile section of the Burke-Gilman Trail that runs through the City of Lake Forest Park between NE 145th Street to the City of Kenmore's Log Boom Park (formerly known as Tracy Owen Station). The purpose of this study was to locate and delineate wetlands using the state-approved methodology for wetland delineation, to identify and delineate streams, to describe and classify delineated wetland areas and streams, and to discuss the regulatory implications of these findings. Wetlands and streams were classified according to the *Lake Forest Park Ordinance No. 930: Sensitive Areas Update* (adopted December 1, 2005) and the *Washington State Wetland Rating System for Western Washington, Revised* (August 2004, updated July 2006).

The Burke-Gilman Trail is proposed to be widened and resurfaced from the Seattle City Limits at NE 145th Street to the Kenmore City Limits near Log Boom Park. The project is intended to improve safety issues and ease of use for trail users. The existing 10-foot-wide paved trail is proposed to be widened to 12 feet. Also included are features such as signage improvements, site furnishings, and fencing. The corridor is situated in portions of Sections 10, 11, and 15 of Township 26 North, Range 4 East in the City of Lake Forest Park (Figure 1).

METHODS

The study area was screened for wetlands using methodology from the *Washington State Wetlands Identification and Delineation Manual* (Washington Department of Ecology [WDOE] 1997). Vegetation, soils and hydrology were examined, and areas meeting the criteria set forth in the manual were determined to be wetland. Streams also were identified and the Ordinary High Water Marks (OHWM) were flagged on-site. Wetland and stream delineation field work was performed by Jennifer Creveling and Dan Nickel during March 2006.

Vegetation was evaluated across the site to determine the presence of hydrophytic communities. Plant communities are considered hydrophytic when more than 50 percent of the dominant species have a wetland indicator status of facultative (FAC), facultative wetland (FACW), or obligate wetland (OBL), as listed in the *National List of Plant Species That Occur in Wetlands, Region 9 - Northwest* (Reed 1996 and 1988).

Soil pits were dug to examine soil characteristics and to determine the presence of hydric soil. Soil color was determined using the *Munsell Soil Color Chart* (Munsell Color 1992). Soil texture, structure, moisture and other features also were noted. In general, a matrix chroma of 1 or less in un-mottled soils and a matrix chroma of 2 or less in mottled soils are considered indicative of hydric soil. Gleyed colors are also indicative of hydric soils.

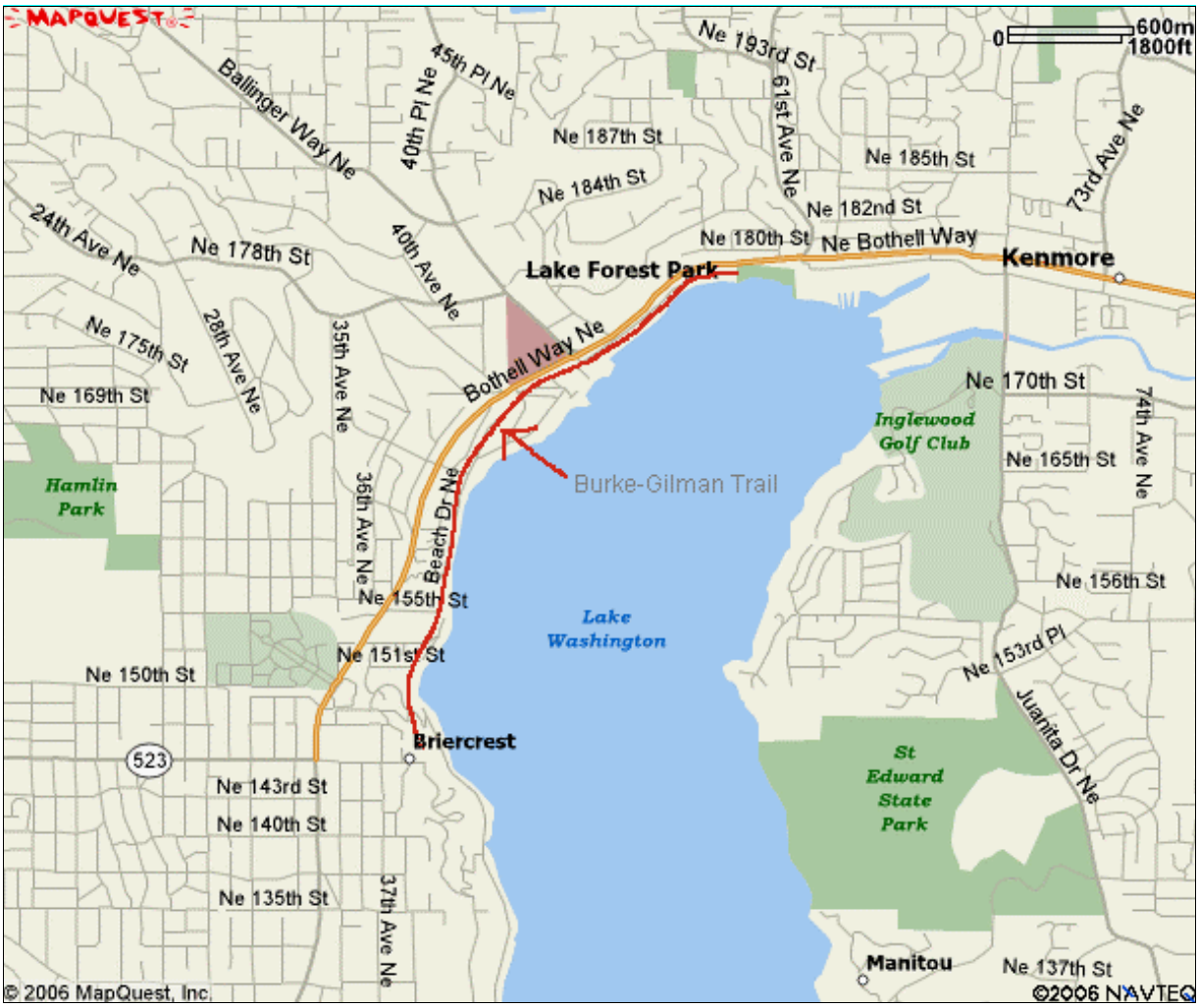

Figure 1. Vicinity map (from MapQuest).

Direct observations and indicators of wetland hydrology were evaluated and recorded. Wetland hydrology is considered present when soil is inundated or saturated in a major portion of the root zone consecutively for at least five percent of the growing season. The time of year and recent precipitation history were considered when evaluating hydrologic conditions on the site.

Delineated wetland boundaries were marked with pink/black-striped field flagging; wetland determination data points were marked with yellow/black-striped field flagging; and streams were marked with orange flagging. All flagging was located and surveyed by PACE, Inc.

RESULTS

Portions of eight wetlands were delineated and surveyed within the study area and labeled Wetlands 1 through 8. Portions of five streams also were identified including Lyon Creek, McAleer Creek, and three smaller unnamed streams. The Ordinary High Water Marks (OHWM) of Lyon and McAleer Creeks, and the centerlines of Streams 3 and 4, were delineated and surveyed. Stream 5 flows through a steel half-pipe adjacent to the trail and was located by surveyors.

General Site Description

The study area is located in Water Resource Inventory Area (WRIA) 08 – North Lake Washington Drainage (Washington Department of Fisheries 1975). This area is also within the East Lake Washington, Lyon Creek, and McAleer Creek Sub-basins of the Cedar River Basin (King County 1990).

Topography within the study area slopes generally to the south and east toward Lake Washington. The existing trail is relatively flat as it is an old railroad grade. There are residential areas along most of this section of the Burke-Gilman Trail, as well as associated parks and commercial districts.

Vegetation

Vegetation within the study area is a mix of forest, shrub, and herbaceous plant communities. The upland portions of the study area are characterized by scattered trees such as Lombardy poplar (*Populus nigra*, NI), black cottonwood (*Populus balsamifera*, FAC), red alder (*Alnus rubra*, FAC), bigleaf maple (*Acer macrophyllum*, FACU), and some conifers including Douglas-fir (*Pseudotsuga menziesii*, FACU), western hemlock (*Tsuga heterophylla*, FACU-), and western red cedar (*Thuja plicata*, FAC). Dominant shrubs and ground cover include Himalayan blackberry (*Rubus discolor*, FACU), vine maple (*Acer circinatum*, FACU), osoberry (*Oemleria cerasiformis*, FACU), snowberry (*Symphoricarpos albus*, FACU), English holly (*Ilex aquifolium*, NI), English ivy (*Hedera helix*, NI), sword fern (*Polystichum munitum*, FACU), dandelion (*Taraxacum officinale*, FACU), grasses and weeds.

Wetlands in the study area also support a variety of plant communities. Forested wetlands are primarily dominated by black cottonwood, Lombardy poplar, weeping willow (*Salix sepulcralis*, FAC+), and red alder in the canopy. Shrubby areas include salmonberry (*Rubus spectabilis*, FAC+), hardhack (*Spiraea douglasii*, FACW), red-osier dogwood (*Cornus sericea*, FACW), and blackberries. Emergent vegetation includes soft rush (*Juncus effusus*, FACW), creeping

buttercup (*Ranunculus repens*, FACW), horsetail (*Equisetum sp.*), English ivy, reed canarygrass (*Phalaris arundinacea*, FACW) and other grasses.

Soils

The study area is outside the limits of the *King County Soil Survey* (USDA 1973). Soils on-site were observed to be quite variable, as is typical in urban and other highly manipulated settings. As stated above, this section of the Burke-Gilman Trail is an old railroad grade along the western shore of Lake Washington. Soil conditions have been influenced over time by railroad and trail building, adjacent residential development, drainage management, and ditch maintenance. Fourteen test pits were recorded in the study area, and many more test pits were examined during the course of the study. The locations of all recorded test pits are indicated on the maps in Appendix A.

Hydrology

There are maintained ditches along much of the length of the trail. Wetland hydrology in the form of saturated or inundated soils was evident in all of the delineated wetland areas. Wetland areas derive water primarily from hillside seepage, upland runoff, and direct precipitation.

Wetlands

As stated above, partial boundaries of eight wetland areas were delineated and labeled Wetlands 1 through 8. Only the boundaries adjacent to the trail which were relevant to potential wetland impacts were flagged.

All of the wetlands flagged as part of this study are at least somewhat associated with ditches adjacent to the trail. Wetlands 2 and 4 are relatively broad and distinct depressions between the trail and road.

Wetland 2 is a primarily shrubby area on the west side of the trail south of Lyon Creek. There is a large weeping willow and several cottonwood trees in and adjacent to the wetland. It appears that a number of red-osier dogwood plants may have been installed in the wetland at some time in the past. Also present in the wetland are Himalayan blackberry, Watson's willow-herb (*Epilobium ciliatum*, FACW-), and horsetail. The buffer area surrounding the wetland is dominated by Lombardy poplar, blackberries, Robert's geranium (*Geranium robertianum*, NI), reed canarygrass, and other grasses. Soil within Wetland 2 was very dark gray (10YR 3/1) silty loam. Outside the wetland, soil was unmottled very dark grayish brown (10YR 3/2) gravelly sandy loam. Wetland 2 was saturated to the surface at the time of observation. A culvert from under Bothell Way NE directs water into the wetland which includes fairly large areas of mud and sediment.

Wetland 4 is a forested depression on the west side of the trail just south of McAleer Creek. It is dominated by large black cottonwoods, blackberries, reed canarygrass, English ivy, creeping buttercup, and Cooley's hedge nettle (*Lamium sp.*). The adjacent buffer area is primarily blackberry, grasses, dandelions, and small osoberry sprouts. Soil observed within Wetland 4 was black (10YR 2/1) gravelly sandy loam. Outside the wetland, soil was olive brown (2.5Y 4/3)

silty clay loam. Wetland 4 was saturated at a depth of four inches below the ground surface at the time of observation. Water-stained leaves were present.

Wetlands 1, 3, 5, 6, 7, and 8 are specific sections of trailside ditches that met the criteria for jurisdictional wetland. As stated above, much of the trail is bordered by maintained and at least partially manmade ditches. Many of these are dominated by highly disturbed and manipulated plant communities, which nevertheless meet the criteria for hydrophytic vegetation. Similarly, essentially all of the ditch areas exhibit characteristics of wetland hydrology since their function is to capture and carry runoff. The greatest distinction between areas determined to be jurisdictional wetland and other similar areas was in their soil characteristics. Wetlands were delineated where there was evidence of apparently native soils with hydric characteristics (as well as evidence of hydrophytic vegetation and wetland hydrology). These areas appear more natural and tend to function more as wetlands, particularly in terms of water storage and wildlife habitat. In most instances, these areas also tend to be more closely associated with hillside seeps or stream flow, instead of primarily with residential storm runoff. Boundaries were identified between wetlands and adjacent non-wetland areas by identifying where the ditch ceased to support these more natural conditions and appeared to exist on top of old fill materials and compacted or cemented soils. In addition, most of the wetland ditches are broader and shallower in cross-section as opposed to steeper, V-shaped profiles of the non-wetland ditch sections.

The wetland determination data sheets are presented in Appendix B. Photographs of the wetlands and their buffer areas are in Appendix C.

Streams

Portions of five streams were identified including Lyon Creek (Stream 1), McAleer Creek (Stream 2), and three small unnamed streams (Streams 3, 4, and 5). Lyon and McAleer Creeks are relatively large, well-defined, and mapped streams. The Ordinary High Water Marks of these two streams were marked in the vicinity of proposed trail improvements.

Stream 3 is a small drainage coming off the hillside north of NE 145th Street. It branches into three small channels, collects in a ditch at the base of the hill and flows into a culvert under the trail toward Lake Washington. Only the two outermost channels were flagged and surveyed; see site plans. Based on the site topography, channel size, deposition, and existing flow during the site visit, this stream likely does not flow year-round during years with normal rainfall and thus would be considered seasonal. Stream 4 is in a landscaped, artificial channel that flows through hillside rocks and a concrete flume, then into a culvert under the trail. Stream 5 is west of Log Boom Park at the east end of the study area. This stream is contained entirely within a corrugated steel half-pipe on the hillside and culverted under the trail. The characteristics of Streams 4 and 5 indicate that these streams probably flow year-round during years of normal rainfall and thus would be considered perennial. In addition to these streams, Bsche'tla Creek is shown on a city map included in *A Salmon's Guide to Lake Forest Park* (Lake Forest Park Stewardship Foundation, 2001). This stream flows through an underground culvert in the vicinity of the Burke-Gilman Trail near 153rd Street. Currently, there is asphalt trail surface up to a flow dissipater, which is approximately four to five feet underground.

According to Washington Department of Fisheries (1975), Lyon Creek and McAleer Creek support chinook, coho, and sockeye salmon. Puget Sound Chinook salmon has been listed as "Threatened" under the Endangered Species Act (U.S. Federal Register, 24 March 1999). Streams 3, 4, and 5 are steep hillside drainages that are unlikely to support fish. Photographs of each stream and their on-site buffer areas are presented in Appendix C.

Wetland Functions and Values

Wetland functions, and their human assigned values, are diverse and numerous. Hydrologically, wetlands are important for flood and stormwater storage, water quality maintenance, and aquifer recharge. This is especially true in developed areas where runoff from impervious services is accelerated and concentrated. Wetlands can also supply a diversity of habitats for the foraging, breeding and rearing activities of wildlife in the area, and wetlands can often provide educational and recreational opportunities for surrounding communities.

Although every wetland serves some function, the type and the degree to which a particular function is served varies from wetland to wetland. This variation is guided by several factors. One of these is the size of the wetland, which can be limited by topography or by surrounding development. A second factor is the vegetation community types and other habitat features present in the wetland and neighboring areas. Other factors include the location of the wetland; proximity to habitat corridors; and hydrological connectivity to stream, lakes or other water bodies and/or to other wetlands. An evaluation of the functions and values of a wetland takes all of these factors into consideration.

The wetlands identified in this study are small, and subject to past and on-going disturbance and maintenance. Their primary function is for limited storage and conveyance of storm water. They also provide some limited water quality functions prior to discharge into the lake, and provide some edge habitat and plant diversity that contribute to the wildlife habitat values of the area. Each wetland was rated according to the *Washington State Wetland Rating System for Western Washington, Revised* (August 2004, updated July 2006). Theses ratings, based on evaluation of water quality, hydrologic, and habitat functions, are detailed below.

REGULATORY IMPLICATIONS

Local Regulations

Wetlands

In Lake Forest Park, wetlands are regulated under *Ordinance No. 930: Sensitive Areas Update* (adopted December 1, 2005). Wetlands are rated into three categories based on size, vegetation classes, presence of open water, and other special features. Artificial wetlands intentionally created from non-wetland sites, including drainage ditches and grass-lined swales are excluded in Section 16.16.040.AA. This is consistent with the determination of jurisdictional wetlands described above.

Standard buffer widths are determined by wetland category with provisions for minimum reduced buffers with buffer enhancement. Wetland categories and required buffer widths are summarized in Table 1. Also shown are vegetation classes in the wetland and buffer areas within the study area.

Table 1. Lake Forest Park wetland categories, required buffer widths, and vegetation classes.

Wetland	Wetland Category	Standard Buffer Width (ft)	Minimum Buffer Width with Enhancement (ft)	Wetland Vegetation Classes in Project Area[1]	Buffer Vegetation Classes in Project Area[2]
1	3	50'	35'	PEM	F, H
2	3	50'	35'	PEM, PSS	F, H
3	3	50'	35'	PEM, PSS	F, S
4	2	100'	70'	PEM, PFO	F, S, H
5	3	50'	35'	PEM	S, H
6	3	50'	35'	PEM	S, H
7	3	50'	35'	PEM	S, H
8	3	50'	35'	PEM	F, S, H

[1] PFO=forested, PSS=scrub/shrub, PEM=emergent, PAB=aquatic bed (according to Cowardin 1979)
[2] F=forested, S=shrub, H=herbaceous

Streams

In Lake Forest Park, streams are regulated under *Ordinance No. 930: Sensitive Areas Update* (adopted December 1, 2005). Streams are rated into three categories based on fish use and flow. Certain features such as irrigation ditches, canals, storm or surface water runoff devices, or other entirely artificial streams are excluded unless they are used by salmonids or to convey surface water naturally occurring prior to the alteration of the land (Section 16.16.040.X.). This is consistent with the stream determinations described above.

Standard buffer widths are determined by stream type with provisions for minimum reduced buffers with buffer enhancement. Stream types and required buffer widths are shown in Table 2. Also shown are vegetation classes in the stream buffer areas within the project site.

Table 2. Stream categories, required buffer widths, and vegetation classes.

Aquatic Area	Stream Type	Standard Buffer Width (ft)	Minimum Buffer Width with Enhancement (ft)	Buffer Vegetation Classes in Project Area[1]
Lyon Creek	Type 1	115'	70'	F, S, H
McAleer Creek	Type 1	115'	70'	F, S, H
Stream 3	Type 3	35'	25'	F, S, H
Stream 4	Type 2	50'	35'	S, H
Stream 5	Type 2	50'	35'	H

[1] F=forested, S=shrub, H=herbaceous

Mitigation Requirements

When alterations to wetlands, streams, or their buffers are proposed, the mitigation sequence of avoidance, minimization, rectification, and compensation for proposed impacts is required. After these steps are completed, mitigation will need to be planned according to guidelines set forth by Lake Forest Park and other permitting agencies.

Under the Lake Forest Park Sensitive Areas Ordinance (SAO), mitigation ratios are determined according to the rating of the wetland or stream and type of impact, as well as the type and

location of mitigation proposed. According to Section 16.16.340 (Wetlands – Mitigation requirements), replacement is required when a buffer is altered pursuant to an approved development proposal. Enhancement may be allowed when a wetland or buffer is altered, when water quality or wildlife habitat functions will be improved. Minimum requirements for enhancement are established in administrative rules. Similarly Section 16.16.370 (Streams – Mitigation requirements) specifies that replacement or enhancement will be required when a stream or buffer is altered pursuant to an approved development proposal. There is to be no net loss of stream functions, and no impact on stream functions above or below the site.

Shorelines

Since Lake Washington is considered a shoreline of statewide significance, this project is also subject to regulation under the Shoreline Management Act (SMA), a state program administered at the local level. Lake Forest Park currently utilizes King County's existing Shoreline Master Program to regulate all shorelines within the City boundary. This Shoreline Master Program is in the process of being revised per State rules and guidance. A shoreline permit will be required for the Burke-Gilman Trail Redevelopment Project.

State and Federal Regulations

The U.S. Army Corps of Engineers (Corps) regulates streams and non-isolated wetlands under Section 404 of the Clean Water Act. If any fill is to be placed in streams or wetlands, the Corps must be notified and the appropriate permits obtained. Depending on the connection of any impacted stream or wetland to habitats containing species listed under the federal Endangered Species Act (ESA), the Corps may require that a Biological Evaluation be prepared to assess effects of the proposed project on listed species (e.g., Chinook salmon). At a minimum, the permit application form would need to justify why the project would have no effect on listed species. ESA consultation with the federal services is likely because of anticipated work within Lyon Creek associated with potential bridge reconstruction. In addition, work within the OHWM would also require a Hydraulic Project Approval from the Washington Department of Fish and Wildlife (WDFW).

If any proposed stream or wetland alteration requires a federal permit, Washington Department of Ecology (DOE) Individual 401 Water Quality Certification and Coastal Zone Management Consistency determination would also be required. For impacts to wetlands, mitigation requirements are outlined in *Guidance on Wetland Mitigation in Washington State* (DOE et al. 2004). Neither the Corps nor DOE regulate stream or wetland buffers.

As stated above, the wetlands were also rated according to the *Washington State Wetland Rating System for Western Washington, Revised* (August 2004, updated July 2006). The rating forms are included in Appendix D of this report. A summary of these ratings is provided in Table 3, along with the enhancement mitigation ratios required by WDOE.

Table 3. WDOE wetland rating scores, categories, and mitigation ratios.

Wetland	Score for Water Quality Functions	Score for Hydrologic Functions	Score for Habitat Functions	Total Score for Functions	Wetland Category	Enhancement Mitigation Ratio
1	10	5	9	24	IV	6:1
2	16	9	11	36	III	8:1
3	14	5	10	29	IV	6:1
4	12	7	10	29	IV	6:1
5	14	5	7	26	IV	6:1
6	14	5	7	26	IV	6:1
7	14	5	7	26	IV	6:1
8	14	5	7	26	IV	6:1

Also as stated above, this project is subject to the Shoreline Management Act regulations, a state law that is administered locally by the City of Lake Forest Park. Washington Department of Ecology has primary responsibility to review issued permits for conformance with the SMA.

PROPOSED IMPACTS AND MITIGATION

Proposed Impacts and Mitigation

Some wetland, wetland buffer, and stream buffer areas will be impacted by widening the paved trail on either or both sides of the existing trail. These are primarily grassy and weedy areas adjacent to the existing trail and sideslopes of adjacent ditches. These impacts have been avoided and minimized as much as is possible by shifting the trail alignment where appropriate and taking into consideration safety and visibility requirements.

This project will result in 2,169 square feet of wetland fill in Wetlands 1, 5, 6, and 8. As shown on Table 1, these are all Category 3 wetlands according to Lake Forest Park regulations. Mitigation for Category 3 wetlands is specified at a 2:1 ratio, requiring 4,338 square feet of mitigation. Furthermore, as shown on Table 3, these wetlands are considered Category IV wetlands according to the Washington Department of Ecology rating system. Enhancement ratios for Category IV wetlands are 6:1, requiring 13,014 square feet of mitigation to satisfy WDOE requirements. Wetland and stream buffer impacts are to be mitigated at 1:1.

Lake Forest Park mitigation requirements for wetland, wetland buffer, and stream buffer impacts can all be accomplished on site. There are opportunities to enhance wetland, wetland buffer, and stream buffer areas along the project by removing invasive plant species and planting other native species for improvement of wildlife food and cover features. These areas have been identified and quantified, as shown on Tables 4 and 5.

Table 4. Proposed wetland and wetland buffer impacts.

Wetland	Wetland fill (sf)	Wetland enhancement mitigation needed (6:1 ratio, sf)	On-site mitigation area (sf)	Wetland buffer impact (sf)	Wetland buffer mitigation needed (1:1 ratio, sf)	On-site mitigation area (sf)
1	598	3588		4553	4553	
2			2974	3383	3383	7138
3			735	189	189	4046
4			1300	3437	3437	4496
5	985	5910		4623	4623	
6	26	156		1941	1941	3205
7				949	949	
8	560	3360	1087	1821	1821	1946
TOTAL	2169	13014	6096	20896	20896	20931

Table 5. Proposed stream buffer impacts.

Stream	Stream buffer impact (sf)	Stream buffer mitigation needed (1:1, sf)	On-site mitigation area (sf)
Lyon Creek	6553	6553	9266
McAleer Creek	2692	2692	3361
Stream 3	584	584	181
Stream 4	1216	1216	278
Stream 5	1274	1274	
TOTAL	12319	12319	13086

Some of the additional wetland mitigation area required to meet WDOE standards will also be provided on site by enhancing all potential wetland mitigation areas shown on Table 4 (6,096 square feet). The remaining 6,918 square feet needed will be provided off-site at a location to be determined with Lake Forest Park city staff.

Additionally, the bridge at Lyon Creek is proposed to be replaced as part of this project. This design is not yet complete and may potentially result in some additional impacts and required mitigation. The bridge replacement at Lyon Creek provides opportunity to improve water quality, as well as aesthetics, with removal and replacement of old creosote pilings.

Mitigation Plans

On-site mitigation plans have been completed and are included with this submittal. These plans detail areas of wetland, wetland buffer, and stream buffer vegetation enhancement. Non-native, weedy species will be removed and replaced with native plant species chosen for their wildlife habitat value. This will increase the diversity in these areas in terms of both plant species and structure, and contribute to an overall increase in ecological function. These replanted areas will also increase aesthetics of the trail-side wetlands and buffers.

Off-site wetland mitigation plans will be provided separately as they become available.

The findings of this wetland and stream delineation study are subject to review and acceptance by local, state and federal regulatory authorities.

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